

REPLACEMENT PARAGRAPH, PAGE 1, 4TH PARAGRAPH

FIGURE 1 ~~The figure~~ shows schematically and fragmentary, as an embodiment example of the invention, a top plan view of a machine during continuous bending of a long product.

REPLACEMENT PARAGRAPH - LAST PARAGRAPH OF PAGE 1
THROUGH FIRST PARAGRAPH OF PAGE 2

FIGURE 1 ~~The figure~~ shows a long product 11, which may be a steel product, during continuous bending in a bending machine. The long product is shown as a U-girder or as a steel plate having bent-up sides. The bending machine is shown utmost fragmentary and schematically. It has a feeding device in the form of two motor-driven rolls 12, 13 that feed the long product through the machine. The machine has a first fixed roll 14, which abuts against one of the sides of the long product, and a roll 15, which is adjustable and abuts against the other side of the long product. A third roll 16 is displaceable by means of a power means 17 to and from the long product, as is shown by the arrow, for bending the product to the desired radius when the product is fed through the three rolls 14, 15, 16.

REPLACEMENT PARAGRAPH - PAGE 3, LAST PARAGRAPH
THROUGH PAGE 4, FIRST PARAGRAPH

Roofing sheet having standing seam, where the raised longitudinal edges of the sheet-metal plates are terminated by beads that are snapped together, are normally only used as straight sheet-metal plates. SE 0103229-1 and PCT/SE02/01689 (corresponding to U.S. Serial No. 10/806,865 filed March 23, 2004 and published as US 2004-0173002A1 on September 9, 2004) provide, however, a method and a machine for bending such sheet-metal plates. The raised edges are rolled thinner against the beads in order to get a bending that is adapted for a convex roof, for instance a domed roof, or the raised edges are instead rolled thinner against the bottom when a bending adapted for a concave roof is desired. In this application for roofing sheet, the actual bending adapted for a concave roof is desired, in this application for roof sheet, the actual bending radius may vary fairly much from the one desired by virtue of stresses in the roll-shaped sheet metal. Therefore, the present invention has a particular bearing on that product. The invention is directly applicable on the machine that is shown in these patent applications, but it is also possible to supplement the machine shown in the references with the bending rolls 15 and 16 shown in the present application. These rolls are then arranged after the rolling rolls and provide a last bending for final adjustment of the bending radius. It is possible to control both the rolling rolls and the roll 15 in response to the calculated actual bending radius or only control

the roll 15 in this way. The bending device will in this case comprise both the rolling rolls according to the above-cited publications and the bending rolls 15 and 16. The machine according to the above-mentioned publications ~~is not described but reference is made to the publications~~ is illustrated in Figure 2 of the drawing described herein.

NEW PARAGRAPH, PAGE 1, AFTER 4TH PARAGRAPH

FIGURE 2 shows a first apparatus for rolling thinner the raised edges of a roofing sheet, and a second apparatus for completing the bending of the roofing sheet.



NEW PARAGRAPH - AFTER PAGE 4, FIRST PARAGRAPH

FIGURE 2 illustrates the bending apparatus of the aforementioned published U.S. patent application generally designated by reference numeral 30, the outlet of which feeds a sheet into the inlet of a device illustrated by FIGURE 1 for bending the sheet into the desired radius generally designated by reference numeral 32. The same reference numerals in FIGURE 2 are used for the corresponding elements in FIGURE 1. The bending apparatus 30 of FIGURE 2 is shown during the rolling of a metal roofing sheet 34 with upstanding edges that end in beads. One of the beads is larger than the other so that the beads of two adjacent sheets can be snapped together and if necessary also then be rolled sealed. The flat parts of the edges are clamped between two rolls 36, 38 and 40, 42 respectively of two rolling devices 44, 46. The rolling unit comprises a frame 48 with guides in the form of guide rails 50, 52 respectively for the two rolling devices 44, 46. Since the two rolling devices, each one for rolling an upstanding edge are similar, only the rolling device 46 is described in detail. It has a frame 54 that is slidably carried and guided by the guide rails 51, 53. The frame 54 can be moved along the guide rails by means of a ball screw 56. The frame 54 carries slidably on a guide 57, a bearing housing 58 in which an inner bearing part 60 is turnable. An axle 62 for the roll 40 is journaled in this bearing part 60. The bearing part 60 is turnable in the bearing housing 58 by means of a ball screw 64, and the bearing housing 58 is movable along the guide 57 by

means of a ball screw 66. The roll 42, the counter roll, is journaled in a housing 68, the position of which is adjustable by means of a ball screw 70. By angular adjustment of the rolls 36, 38 by means of the ball screw 64, one may roll the edges gradually thinner towards their beads, which makes the outer parts of the edges longer and bends the sheet.